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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Water Bombs

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A SCIENCE SERVICE PUBLICATION

## BIOCHEMISTRY

# Photosynthesis Probed

Mystery of how plants make sugar from water, air and sunlight, the basic food-producing reaction, is half solved. Full solution is expected in less than ten years.

► **HALF OF** the great mystery of photosynthesis, conversion of sunlight into food, has been solved.

Scientists now know in great detail how carbon dioxide of the air and water are converted into sugar through action of helping chemicals called enzymes.

How the energy of the sunlight is converted into a form that can be used in this process is still unknown.

A great step in understanding photosynthesis was made at the Oak Ridge National Laboratory, Tenn., when Drs. Edward Tolbert and L. P. Zill, starting three years ago, made progress in obtaining conversion of air-water elements into sugars by living protoplasm outside the cell itself.

The living protoplasm came from cells of one of the large algae. Textbooks always taught that removal of the protoplasm from the cell stopped the photosynthesis.

The Oak Ridge scientists got 15% conversion into sugars in the test tube, a much higher rate than anyone else has reported.

This success, described in Atomic Energy Commission hearings before the House appropriations subcommittee, was reported in a scientific journal last year.

Dr. Tolbert told SCIENCE SERVICE that the energy puzzle would be solved in less than a decade of further research and that artificial photosynthesis would be available scientifically long before there is dollars and cents need for it.

If the world were starving, we could even now, due to knowing how to make sugar in the test tube, produce food on a large scale, he said. This may be needed in another hundred years when world conditions demand it.

The Oak Ridge group is only one of several in the United States that are working on the mysteries of photosynthesis. At present, like several other teams of biochemists, the Oak Ridge work is devoted to the way that some 20 enzymes, which act as catalysts, participate in the sequence of cyclic steps that build the raw materials into the carbohydrates of the plant. The first product made seems to be phosphoglyceric acid.

The energy needed to build the sugars comes from the sun and must be converted from radiant into biochemical energy that can be used in the synthesis. Just how this is done is an unsolved problem.

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## ENGINEERING

# Better Food in Cool Homes

► **DINNERS IN** air-conditioned homes have 40% more calories than those in similar non-air-conditioned homes. And air-conditioning saves as much as 22 woman-hours per month in cleaning.

The extra calorie content of meals is not the result of any chemical changes caused in the foods by conditioned air, but stems from better appetites and willingness of cool housewives to prepare better meals.

This information, the result of a study of a special 22-house "village" in Austin, Texas, was reported to the American Society of Refrigerating Engineers meeting in Milwaukee. All the test homes had "residential conditioning," complete air conditioning through air ducts from a central conditioning plant.

Work-hour reductions for the housecleaner result from the filtered-air features in conditioning units.

Tomorrow's air conditioners will have less gadgets if manufacturers follow the results of this test, which showed consumer preference for simplicity of manual controls.

The study also showed that families choose to keep their homes at 75 to 78 degrees Fahrenheit with even humidity be-

tween 40% and 60%. Families complained vigorously when researchers exposed them to rapid changes in humidity, even when the temperature remained the same.

Families in the test houses showed a definite preference for continuous fan circulation of air, even when the compressor was not needed to cool the air. Some residential conditioning unit manufacturers have attached the fan to the compressor so that it only operates when cool air is being produced.

Connected with air circulation is the problem of where to locate air registers in duct systems that operate with both heating and cooling units. Hot air rises but cool air falls, so where should the ducts be placed for maximum efficiency of both furnace and conditioner? Research at the Austin village may give manufacturers an answer.

Already the Austin study has shown one fact that comforts manufacturer and consumer: operating costs for full-house air conditioning are moderate. Operations, even in hot Austin, have cost half of the 22 families less than \$100 per year.

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## • RADIO

Saturday, July 2, 1955, 5:00-5:15 p.m., EDT  
"Adventures in Science" with Watson Davis, director of Science Service, over CBS Radio Network. Check your local CBS station.

Dr. Fillmore H. Sanford, executive secretary, American Psychological Association, will discuss "What Psychology Does for the World."

## NEUROLOGY

## Deep Brain Waves Differ From Surface Waves

► **BRAIN WAVES** from the surface of the brain are different from those deep inside the brain, Dr. Herbert H. Jasper of Montreal, Can., reported to the American Neurological Association meeting in Chicago.

Exploring the depths of the brain with microelectrodes in patients with brain disease or disorder should, in his opinion, reveal much of interest for more complete understanding of the complexities of brain function.

Brain waves show the electrical activity of the brain. Ordinarily these are obtained through electrodes implanted on the surface of the brain.

When Dr. Jasper put microelectrodes at different depths below the surface he was, he reported, "impressed by the rich variety of electrical activity" not recorded in the surface brain wave records.

A surface wave may reverse its sign, becoming positive deep in the brain although it was negative on the surface.

Sustained rhythmic discharges of electrical activity characteristic of epilepsy may be sustained in the first three layers of the brain without invading the deep layers.

Because of his findings, Dr. Jasper is not now surprised that the electroencephalograph, or brain wave recording machine, is of such "limited" value in revealing significant brain activity.

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## MEDICINE

## Mistake Arthritic Bone Destruction for Cancer

► **ARTHRITIS CAN** destroy bones extensively. When seen under X-rays, the destruction may look like cancer.

The bone destruction may be at quite a distant part of the body from the joints that are directly involved in the arthritis, making it even harder to diagnose the condition.

The destruction may be such that one or more bones in a finger may disappear completely. Wrist bones may also be involved. As the finger bones disappear, the bones that are left become telescoped. This results in the "opera glass hand" characteristic of rheumatoid arthritis.

Examples of the arthritic bone destruction were given by Dr. Otto Stein Brocker of New York at meeting of American Rheumatism Association in Atlantic City, N. J.

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## BIOCHEMISTRY

# New Hormone Era Seen

**New light on structure of ACTH molecule gives promise of synthesis and precision use of hormones from the pituitary gland. Study shows activity is retained in molecule fragments.**

► A NEW era in hormone treatment may be foreshadowed by the development for the first time of a picture of the complete structure of the ACTH molecule.

Dr. C. H. Li, professor of biochemistry at the University of California, and his colleagues have completed the tortuous five-year job of identifying each of the 39 amino acids, the chemical building blocks, that are linked in a straight chain to form the ACTH molecule.

They also stripped 11 amino acids off the right side of this chain, and the remaining fragment still retains the ACTH biological activity.

The work opens the door to a better understanding and to the possible future synthesis and precision use of the powerful hormones produced by the anterior (front part) pituitary gland. These hormones are the prime movers of reproduction, growth, maturation and general metabolism.

This is the first time the structure of one of these anterior pituitary hormones has been clarified. Last year Dr. Vincent du Vigneaud of Cornell University Medical College, New York, reported the structure and synthesis of oxytocin and vasopressin, hormones of the posterior pituitary.

These hormones have small molecules, however, containing eight amino acids, and they are involved in the muscular contractions of labor and the release of milk in new mothers.

Dr. Li has taken a concrete step toward the duplication, with the larger and wider-ranging anterior hormones, of Dr. du Vigneaud's feat with the posterior hormones.

One of the difficulties of working with the anterior pituitary hormones, such as ACTH, has been the complexity of the effects these secretions have on the body. In the treatment of rheumatism, for example, the use of the hormone is limited by unwanted deleterious side effects.

Now, with a complete knowledge of the structure of the hormone, it may be possible to determine whether different biological effects are located in different portions of the ACTH molecule. If this turns out to be the case, it may be possible to synthesize fragments of the molecule with more specific activities, thus getting rid of unwanted side effects and using a "bull's-eye" rather than "shotgun" technique in hormone treatment.

An indication that biological activity does lie in fragments of the molecule is provided by Dr. Li's successful retention of ACTH activity in a fragment of the molecule.

Dr. Li is the scientist who has been chiefly

responsible for the isolation of five of the six anterior pituitary hormones, including ACTH, the growth, lactogenic, follicle-stimulating and interstitial cell-stimulating secretions.

Much of the latest work has been reported in the scientific literature already. The final report detailing the complete structure of the ACTH molecule will be made on June 29 at the Gordon Conference on Proteins, at the New Hampton School, New Hampton, N. H. Dr. Li's colleagues are Drs. I. I. Geschwind, J. S. Dixon, R. D. Cole, and I. D. Raacke, research biochemists.

Dr. Li reported partial structure of the sheep ACTH molecule, with which he works, last year. The partial structure of ACTH extracted from hogs was reported in November, 1954, by American Cyanamid Company scientists and by Armour & Company scientists in March, 1955. The sheep and hog ACTH molecules are different.

The Berkeley scientists call the larger molecule alpha-corticotropin (molecular weight 4500) and the smaller one, with 28 molecules, beta-corticotropin (molecular weight 3000). They are white powders, almost crystalline. The smaller molecule is slightly larger than a sucrose molecule.

The five-year project cost about a quarter of a million dollars, and was supported primarily by the U. S. Public Health Service, the Eli Lilly Laboratories and the Lasker Foundation.

The preparation of the two hormones is difficult and tedious and not presently adaptable to commercial use. Only about two grams (1/14th of an ounce) of the precious hormone could be extracted from 360,000 sheep glands in years of work. Tests indicate that the hormones are unexcelled in potency and purity.

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## TECHNOLOGY

## Automatic Device Records Reactor Heat

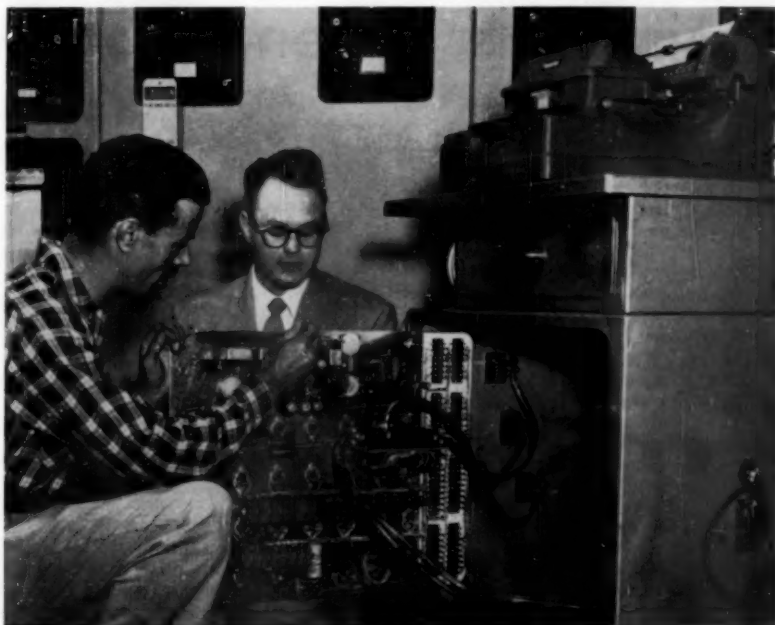
► PLUTONIUM REACTORS now have their temperatures taken by thermometer-typewriters that instantly record temperature without the help of human hands.

The automatic devices instantly tell scientists the temperature of reactors, which become dangerous when too hot, and are inefficient if too cool.

Before automation, manual methods of making temperature charts took so long that information was old by the time it was recorded. Thermometer-typewriters installed in the Hanford plutonium plant, operated by General Electric for the Atomic Energy Commission, compile in minutes information that took hours to assemble manually.

Thermocouple temperatures are converted into electrical impulses. These are then translated into a code that triggers the typewriter keys, recording the temperature.

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**TYPES TEMPERATURE**—This typewriter at the Hanford Atomic Products Operation records temperatures inside atomic reactors.

## GENERAL SCIENCE

# "How-To-Do-It" — a Hobby

► A HOBBY by any other name is confusing. The Government, which has discontinued some how-to-do-it books, notably the National Bureau of Standards' *Care and Repair of the House* (see SNL, May 21, p. 323), has now published a catalogue of available books entitled "Hobby Publications."

"Hobby publications, as such," the catalogue states "are not published by the Government. However, many of the books, circulars, and pamphlets issued by the various Government departments and agencies, as part of their official programs, contain information that could possibly be useful to hobbyists or those seeking interesting pastime activities."

The catalogue lists 11 such hobby-like categories and one other called "Miscellaneous" in the contents. Included are such pastimes as aviation, birds, cooking, collecting, gardening, photography and sewing.

Altogether, there are 91 books, circulars and pamphlets listed, ranging in price from five cents for a six-page folder entitled *Pointers on Making Good Lawns* to \$4.50 for a paper-bound, 734-page book with illustrations, *Life Histories of North American Wood Warblers*.

Each section is headed by a small paragraph devoted to spelling out why the subject is attractive to some people and is possibly a hobby.

Under the section "Birds," for instance, the Government reports, "Four popular Government publications written especially for the bird fancier, for those who find attracting, protecting and observing birds a pleasing hobby."

Under "Building, Painting and Repairing," the Government says, "Many men find that woodworking, carpentry and painting, done in their spare time is not only a pleasant pastime, but also one that can result in real savings."

Most of the publications are of interest and value. Helpful hints, and how-to-do-it techniques are transformed into readable material with illustrations and blueprints where needed.

Those interested in husbandry can find hobby publications instructing them on how to raise hamsters, geese, turkeys, guinea pigs, minks, squabs, ducks and chinchillas. Housewives can learn about canning, pickling or poultry cooking and fitting dresses, caring for the sewing machine or making coats at home.

Even for the newspaperman the Government has provided a pamphlet entitled *U. S. Government Printing Office Style Manual*, pointing out that "the art of writing is a hobby and profession that is centuries old." It covers grammar and general information "for writers and editors."

Science News Letter, June 25, 1955

## NEUROLOGY

## Brain Tells When to Stop

► DISCOVERY OF a new function of the human brain was announced by a group of New York neurologists at the meeting of the American Neurological Association in Chicago.

It is the capacity to determine when a behavior pattern is appropriate and to stop it when the pattern is no longer appropriate. A decrease in this function, as shown by certain tests, points to brain damage. There is no particular brain center or region for this function.

The function, or its absence, were shown by tests, including one in which the subject stands with arms stretched out, tongue stuck out, eyes closed. Those without brain damage soon stopped to ask the purpose of the performance. Those with damaged brains continued for long periods without question.

Another test required writing small circles in a horizontal row and then, on command, changing abruptly to write parallel lines in a vertical row. A second part of this test was writing a series of "Z's" and then changing abruptly to a right-angled figure.

Persons with intact brains changed easily and completely from one established pattern

to the other. Those with damaged brains did not, nor did they make any comment when asked to go back to writing circles instead of straight lines. The more extensive the brain damage, the more trouble they had changing patterns.

Scientists reporting this brain function were Drs. Thomas C. Guthrie, Louis Berlin, Arthur Weider, Helen Goodell and Harold G. Wolff.

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## ASTRONOMY

## Naked-Eye Comet Visible in Sky

► A NAKED-EYE comet is now visible in the sky. It looks like a star surrounded by a luminous fog and is trailed by an invisible hazy tail.

The comet, discovered on the evening of June 12, can be seen in the constellation of Perseus, which swings from low in the northwest in the evening to northeast in the early morning.

Its magnitude is six, but good viewing conditions are needed to spot it.

The first comet bright enough to be seen by naked eye from the Northern Hemisphere in several years, it was discovered by Antonin Mrkos of the Skelate-Pleso Observatory in Czechoslovakia. The new comet, the fifth to be found this year, is named after him.

When discovered, the comet's position in the sky was right ascension, four hours, 45 minutes; declination, plus 44 degrees, 14 minutes. It was found at 20 hours and 48 minutes, Universal Time, which is 4:48 p.m. EDT.

It is moving to the north, away from the sun, and will become fainter.

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## ENTOMOLOGY

# Tire Waves Cut Power

A colony of bees has been flown from Paris to New York to find out if the insects can really tell time or if they set their schedules by external factors such as sun position.

► **BEES HAVE** a memory and a sense of time. They remember feeding places and return to them day after day, but only at given times each day.

How do the bees "tell time"? Do they measure the passage of time by external factors, such as the position of the sun, or do they possess a kind of internal metabolic "clock"?

To solve this question, 5,000 honeybees have been flown from Paris to New York to see if they dine on Paris time or Eastern Daylight Saving Time.

The bee colony was trained to take sugar water from a table in a Paris laboratory from 8:30 to 10:30 p.m. The bees were flown from there to New York City in approximately 19 hours on June 13, and were hustled off to a room in the American Museum of Natural History identical in all respects to their old home in Paris.

Scientists then watched around the clock to learn when the bees would come out to feed. Would it be from 3:30 to 5:30 p.m., corresponding to 8:30 to 10:30 Paris time, or at some new hour, perhaps 8:30 to 10:30 on the new time? If the bees maintain their old 24-hour schedule, an internal sense of time will be indicated. And if they change their feeding hours, then external factors must be looked for.

Running the experiment are two young German biologists, Dr. Max Renner and Dr.

Werner Loher, both associates of the world-famous bee authority, Dr. Karl von Frisch of the University of Munich. Dr. Loher came to the United States some time ago to set up the duplicate testing room, while Dr. Renner came over with the shipment of bees.

Drs. Theodore C. Schneirla and Lester Aronson of the Museum staff helped arrange experiment facilities here.

The first part of this experiment has already been finished, but the scientists are withholding the results until further work has been done. Following their observations on the bees' feeding time in New York, Drs. Renner and Loher will retrain the bee colony to come for their food at a different time. The bees will then be shipped back to Paris, where the observations will be repeated to double-check the New York findings.

Ordinarily, U. S. Department of Agriculture regulations forbid the importation of bee colonies into the United States, because of a parasitic mite infestation of the European honeybees. Permission for entry of this colony was granted, however, under the conditions that the bees be free of the mite and be kept under strict seal from the time they left France until they were in the closed testing room in the American Museum of Natural History.

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## ENGINEERING

# The Waves Cut Power

► **WAVES SET** up in tires of speeding race cars rob a significant amount of power from the vehicle.

The power loss occurs beyond a critical speed determined by the tire's circumferential tension and the density of tread per unit area. Waves are set up by action of the tire on the road.

These facts were shown by an investigation of tires for high-speed cars, including sports cars, reported at the Society of Automotive Engineers meeting in Atlantic City, N. J., by T. J. P. Joy, D. C. Hartley and D. M. Turner of the Avon India Rubber Company, Ltd.

Interest in sports cars has grown so fast in the past eight years that every car-producing nation is manufacturing such autos. The new auto slogan is "Safety Fast," they said.

They described how a car going at high speed skids off the road at a turn. The inside rear wheel is the first to slide, putting extra force on the other rear tire.

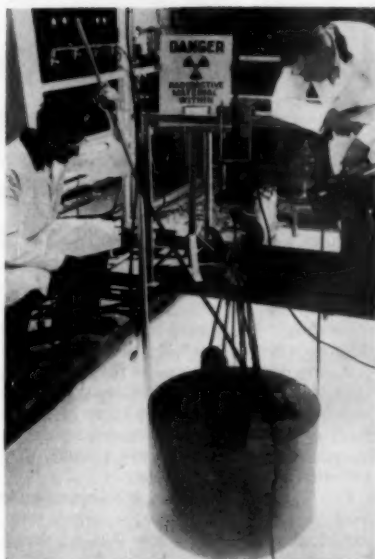
Normally, it cannot sustain this force and the whole rear end breaks away. The car spins around unless rapid reverse steering action is applied.

To reduce the hazard, the inside rear wheel should have the highest possible load. Two ways to achieve this, they said, are to lower the car's center of gravity or to reduce weight transference at the rear by increasing that at the front.

Raising the friction coefficient of the tire is also an effective way of increasing safe speed at a turn. If the coefficient is raised from 0.8 to 0.9, the speed around a 1,000-foot curve can be increased from 95 to 100 miles an hour, they found.

Tire noise was reduced to four categories: squeal, the screeching heard at a high speed turn; hum, coming from the impact of the tread pattern on the road; squelch, a squeal due to flattening of a curved tread on impact with the ground, and rumble, vibration of the casing due to road irregularities.

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**HOT BUCKET**—Four pounds of radioactive cobalt 60 are hoisted up in a five-ton shielding bucket from the water pit at the Brookhaven National Laboratory for shipment. Dr. Richard G. Bauman (right) of B. F. Goodrich watches Geiger counter while Richard N. Chapman of Brookhaven operates hoist control.

## MEDICINE

# Clues to Predicting and Stopping Premature Birth

► **CLUES** TO predicting premature birth long before it occurs and a possible way to prevent such births have been discovered by Drs. E. Stewart Taylor, Paul D. Bruns, Rudolph M. Anker and Vera E. Drose of the University of Colorado Medical Center, Denver.

Between seven percent and ten percent of all births are premature, according to estimates, and about one-fourth of all premature babies die.

A sex hormone deficiency and abnormal activity of the uterus, or womb, early in pregnancy are the signs that the Denver scientists believe show that a woman is going to have her baby prematurely.

Correcting the hormone deficiency in women showing these signs will, the scientists believe, prevent the premature births. However, this extension of the studies remains to be done.

The early clues to prematurity were found through womb activity measurements and analysis of the amount of sex hormones excreted by the same patients every two weeks from the twentieth week of pregnancy to delivery. They are believed the first such studies ever made. The research was supported by a grant from the Playtex Park Research Institute of Dover, Del.

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## PUBLIC HEALTH

# Lasting Fallout Danger

A person who leaves his shelter the second day after an H-bomb explosion could be exposed to lethal doses of radiation the first month. Shelter period should be weeks not days.

► THE DANGER from radioactive fallout from an H-bomb would persist for weeks or months, Dr. Ralph E. Lapp, Washington physicist, has warned. Civil defense evacuation should be planned for a longer period than now recommended.

A man leaving his shelter the second day after the explosion of a Bikini-type bomb would be exposed "to a maximum of almost three lethal doses of radiation in the first month," Dr. Lapp said in the *Bulletin of the Atomic Scientists* (June).

Civil defense officials should be preparing for a "shelter phase" of a considerable number of weeks, not of a few days, he urged, particularly since fallout from the March 1, 1954, burst, although large, will not be the "largest or the worst" expected from bombs of the future.

If an emergency standard of one r (roentgen) a day is set as the safety level, 20 times the Atomic Energy Commission's present limits, Dr. Lapp suggested it will be from six to nine months before an area would be safe.

"The persistence of fallout for weeks and months is as radical a departure in weapon effects as is the vast area of fallout itself," Dr. Lapp said.

To learn how to deal with this new problem, the Government should conduct tests in which fission products are distributed over various kinds of terrain, then measure radiation intensities for at least a year.

Decontaminating thousands of square miles is a problem "so far beyond any AEC experience" that Dr. Lapp viewed the possibility with "considerable skepticism."

## Data Not Classified

A physicist formerly with the Manhattan project, Dr. Lapp is now a writer and commentator on atomic energy living in Washington. He emphasized that all material used in his calculations comes from published sources and that he "has never had any access to classified thermonuclear weapons data."

The "real index" of lethal radioactivity from A- or H-bombs is the total roentgen square miles, he said.

The Atomic Energy Commission recently revealed that the radioactivity dose 110 miles downwind from Bikini was 2,000 r. That report, Dr. Lapp pointed out, covered only the first 36 hours "following" fallout.

Totalling the information for all fallout patterns outlined by the AEC, Dr. Lapp deduced a "real index" of 30,000,000 roentgen square miles. This figure agrees closely with an estimate Dr. Lapp made before the AEC issued its public statement on fallout

from the March 1, 1954, test explosion at Bikini.

Taking the example of fallout at 110 miles downwind as 2,000 r, he calculated the "eternity dose" as approximately 8,000 r. The eternity dose is the radiation a person standing in the open would receive if exposed to radioactivity from one hour after the burst to infinity.

If it takes five hours for fallout to become effective 110 miles away, then the following time schedule would hold: five to 12 hours, 1,000 r; 12 to 24 hours, 625 r; 24 to 48 hours, 545 r; two days to one week, 815 r; one week to one month, 720 r, and one month to one year, 840 r.

"Most significant is the fact that while 2,000 r are delivered in the first 36-hour period, an additional 2,500 r follows in the first year.

"This fact is obviously of the greatest significance to civil defense, yet no mention of this residual radioactivity was made by the AEC in its Feb. 15 release," Dr. Lapp wrote.

## Value of Shelter

A person well sheltered during the first two days under the above table of fallout rate would have escaped 2,170 r. At 48 hours, the dose rate outside his shelter would be 15 roentgens per hour.

He could travel to a "cool" area several hours away without serious overexposure, Dr. Lapp said, "provided, of course, that transportation were available." However, if he stayed and were in the open for the next five days, he would face an additional 815 r, and another 720 r in the following three weeks.

"Thus, if he emerged from his shelter at the end of the second day (which would seem justifiable on the basis of the 'official' facts about fallout) he would be exposed to a maximum of almost three lethal doses of radiation in the first month," Dr. Lapp wrote.

Evaluating the possibility of evacuation after fallout to a "cool" area, Dr. Lapp pointed out that this will depend upon the "power and number of the enemy bombs, their nature and conditions of detonation, the local meteorology, and the proximity of the target to other targets."

If bombs were dropped only for the blast-heat punch, then some "cool" areas might exist, although in the northeastern United States particularly, many cities might be bottled up by fallout from nearby explosions. Dr. Lapp noted that Rochester and Syracuse, N. Y., might suffer such a fate if Buffalo were blasted.



**WESTERN PEPPER**—Black pepper, previously grown only in the Orient, is now being successfully cultivated in Puerto Rico. Since pepper plants take three years to reach harvest stage, it will be 1958 before this five-acre tract produces a crop. Dr. Catesby T. Jones is shown examining a pepper plant.

An enemy trying to maximize fallout, however, might resort to pattern bombing, pinning down and immobilizing several cities with one burst. Moreover, Dr. Lapp says, "an enemy might in this way select an aiming point unprotected by point defense of the Nike type."

Rather than detonating bombs from a high tower in ideal weather conditions, they can be set off at the surface when weather conditions, such as a front, might conceal the attack. Fallout would then "not be neatly predictable," and might greatly exceed a 2,000 r dose in the first 36 hours 110 miles downwind.

"Rain-out" might take place instead of fallout, Dr. Lapp suggested, thus producing localized areas of contamination "hotter" than the surrounding region by a factor of ten or more.

Internal hazards cannot be ignored, Dr. Lapp said. Radiostrontium appears "by far the greatest biological hazard," because it has a long life, a high fission yield, can be coated on debris, and resembles calcium in its reactions. Thus it can be taken up by animals and men, where it lodges in bones.

Concerning global contamination, Dr. Lapp calculated that 1,500 superbombs, each with explosive power of 20 million tons of TNT, could produce "global contamination to the extent that at the end of one year, the dose rate would just equal that stipulated for workers in our atomic laboratories."

He concluded that the problem of global contamination would seem to be of minor importance compared with lethal radioactive fallout in localized areas.

## ASTRONOMY

# Saturn Shines in South

Vega, high in the east, is the brightest star of the early summer evenings. Stars vary considerably in color and this is a good time of year to observe differences.

By JAMES STOKLEY

► SATURN, THE only planet easily visible July evenings, shines toward the south, in the constellation of Libra, the scales. And right next to this group, to the left, we see the fine summer constellation of Scorpius, the scorpion, in which red Antares is prominent.

The brightest star of the early summer evenings, however, is Vega, which is high in the east, part of Lyra, the lyre. Below it is Cygnus, the swan, with another star of the first magnitude, Deneb. And to the right, in Aquila, the eagle, we find brilliant Altair.

All these stars are depicted on the accompanying maps, which show the appearance of the heavens at about 10:00 p.m., your own kind of standard time at the first of July, and an hour earlier at the middle of the month.

Two other first magnitude stars are also shown. One is Arcturus, in Boötes, high in the west; the other is Spica, in Virgo, the virgin, to the right of Libra.

Although of fainter stars, Sagittarius, the archer, which is seen to the left of the scorpion, is a characteristic figure of the summer evening.

### "Teapot" Near Scorpion

Perhaps the most easily seen arrangement is that of the "teapot." The spout of this utensil is just alongside the curved tail of the scorpion, the handle above the "r" in Sagittarius, while the lid extends up toward the "m" in the name of the constellation of Scutum, the shield.

During the night, as the turning of the earth makes the stars seem to rotate toward the west, the teapot becomes more and more tilted, pouring out its hot tea on the scorpion's tail!

Just above the scorpion is the large constellation of Ophiuchus, the serpent-bearer, shown on the old star maps as a man carrying a huge snake, which is represented by the figure of Serpens, the serpent, in two parts.

That to the right, toward Bootes, is the head, while the other section, which extends close to Aquila, is the tail. This is the only case among all the 88 constellations in the sky where one is divided into two parts.

Between Scorpius and Virgo is Libra, in which Saturn stands, but originally this figure was part of the scorpion, forming the claws. They were then extended outwards but now are supposed to be drawn in. How-

ever, the old names of the two brightest stars in Libra reflect the history of the group.

The brighter, the one closer to Saturn, is called Zubenelgenubi, while the other, just above, is called Zubeneshemali. These, from the Arabic, mean respectively "the southern claw" and "the northern claw."

## Stars Vary in Color

To the casual observer, the colors of the stars are not very obvious, but they do show a considerable variety of tint. This is a good time of year to see these differences, for Antares, in the south, is the reddest of bright stars.

In contrast, look overhead at Vega, which is definitely white, or even bluish, according to some observers, since judgment of color is to a considerable degree a subjective process.

Dr. M. Minnaert, prominent Dutch astronomer and author of a fascinating book, *Light and Color in the Open Air*, has prepared a scale of star colors, ranging from zero for white, through yellowish white (1), white yellow (2), light yellow (3), pure yellow (4), deep yellow (5), orange yellow (6), orange (7) and yellowish red (8) to red, which is nine.

To take care of the blues, he goes even beyond zero to minus one for bluish white, and minus two for blue. On this scale he places Antares at 7.5, or between orange and yellowish red, while Vega is 0.8, very nearly white.

Of other stars now visible, he places Merak (one of the pointers in the Great Dipper, which in turn is part of Ursa Major, the great bear) at 2.3, Altair at 2.6, Polaris

(the pole star) at 3.8, Dubhe (the other pointer) at 4.9, and the planet Saturn at 4.8.

Actually, these colors give an indication of stellar temperatures. If you heat an iron poker, for example, at 1100 degrees Fahrenheit, it begins to glow with a dull red. It becomes bright red at about 1650, while around 2000 degrees it is yellowish red. From about 2700 degrees and higher it is at white heat.

The same thing occurs with the stars although, as Dr. Minnaert pointed out, a glowing body on earth at 4500 degrees Fahrenheit would be definitely white, while a star whose surface has that temperature appears orange-red. (Antares is an example of about this temperature.)

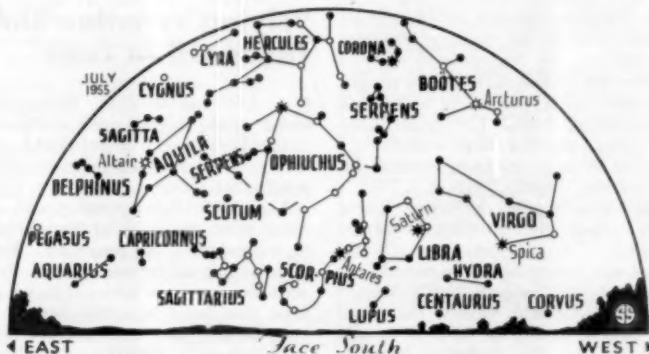
Probably the reason is found in the fact that colors are less obvious when the source appears faint, as a star. At these low intensities, red seems to have a greater relative effect on the eye than green and blue, hence the redness is exaggerated.

The surface temperature of Arcturus, more yellowish, is about 6000 degrees Fahrenheit. That of a white star like Vega is about 18,000 degrees. Our own sun, by the way, has a surface temperature of about 11,000 degrees and is classed among the yellow stars.

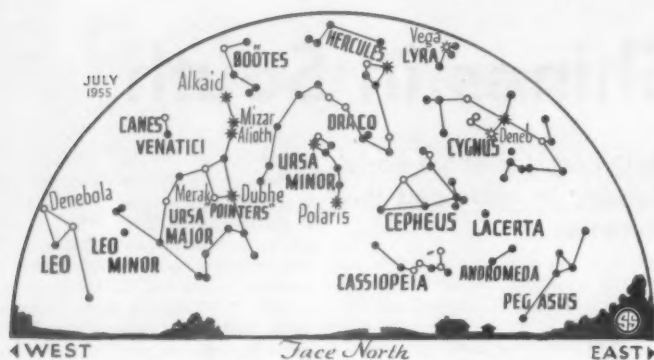
### Green Star

On the other hand, there are some stars that, for one reason or another, do not fit neatly into the color scale mentioned. One is Zubeneschemali, the northern-most star in Libra, which is greenish in hue. It is hard to appreciate this, looking at it with the naked eye, but if one has a chance to look through a telescope, it is very apparent, and even a pair of binoculars will help.

Actually this is a late B-type star, which is even hotter than those of the class to which Vega belongs. This alone does not cause the green color, which is due to certain pe-



☼ ☼ ☼ ● SYMBOLS FOR STARS IN ORDER OF BRIGHTNESS



cular absorption bands in its spectrum that take out some of the colors, leaving the green part to predominate.

So, when you look at the stars, compare their colors, and see how these differ. This will add a new dimension of pleasure to those one can get from a knowledge of the skies that shine above us nightly.

### Celestial Time Table for July

July	EST	
2	4:00 a.m.	Moon farthest, distance 252,200 miles.
4	5:00 p.m.	Earth farthest from sun for year, distance 94,448,000 miles.
5	12:28 a.m.	Full moon.

9	6:00 a.m.	Mercury farthest west of sun, visible for a few days about now low in east just before sunrise.
12	3:31 p.m.	Moon in last quarter.
17	3:00 p.m.	Moon nearest, distance 224,400 miles.
19	6:34 a.m.	New moon.
26	10:59 a.m.	Moon in first quarter.
27	1:38 p.m.	Moon passes Saturn.
28	early a.m.	Meteors visible radiating from constellation of Aquarius, the water-carrier.
29	5:00 p.m.	Moon farthest, distance 251,600 miles.

Subtract one hour for CST, two hours for MST, and three for PST.

Science News Letter, June 25, 1955

### MEDICINE

## Vitamins for Bruises

► A BEFORE and after treatment to reduce the bruises and black-and-blue marks of athletes engaged in football, soccer, lacrosse and other contact sports was reported by Dr. A. Lee Lichtman of Manhattan's Polyclinic Hospital, New York, at the National Athletic Trainers' Association meeting at Indiana University.

For runners and others needing to get more oxygen to their muscles, Dr. Lichtman suggests anti-anemia vitamin B-12.

The before-bruise treatment consists of doses of ascorbic acid, or vitamin C, and hesperidin, a chemical found in citrus fruits. This, Dr. Lichtman believes, will strengthen the walls of even the smallest capillary blood vessels.

A bruise, he explained, is chiefly a mass of damaged capillaries that let blood leak into surrounding tissues. The leaked blood gives the black-and-blue discoloration.

The after-bruise treatment consists of injections of the enzyme, trypsin. This is given immediately after the bruise-causing blow, or as soon after as the rules of the game permit. Trypsin, in some still unexplained way, moves rapidly to the affected area to reverse the inflammatory process.

With this treatment, bruises that ordinarily would be painful for 10 days "subside almost overnight," Dr. Lichtman reported. He said unusually bad bruises are over in three days instead of two weeks.

The treatment was given to 124 athletes who suffered bruise-causing blows. Results were excellent in 85, Dr. Lichtman reported, and good in 36. In the other three cases, there was no response, but in these three, veins had been ruptured, thus giving a different treatment problem.

The vitamin B-12 treatment for helping athletes make better use of the oxygen in the air for extra energy is still in the experimental stage, Dr. Lichtman said.

Science News Letter, June 25, 1955

### AERONAUTICS

## "Flying Venetian Blind" Takes Off in Tests

► A FOUR-ENGINE "flying Venetian blind" model has taken off and landed vertically in tests at Langley Field, Va., the National Advisory Committee for Aeronautics has revealed.

The small experimental model gets its name from the bank of slats attached to its wings behind the propellers. This large blind-like device deflects the propeller backwash downward to achieve lift. Large wing flaps that bend vertically downward also help lift the plane from the ground.

The plane is designed to be convertible. When it reaches flying altitude, the "blinds" fold into the wings and the flap moves to

horizontal position. In this form, ready for fast forward flight, the craft looks very much like a conventional air transport.

The small-scale model can also hover like a helicopter, but rather unsteadily, scientists pointed out. It hovers with its nose pointed 20 degrees upward from the horizontal, an acceptable attitude.

Take-offs and landings were easily performed, though the model had a tendency to move forward as it took off or neared the ground for a landing. This would probably not be a great disadvantage to the pilot of a full scale model, the report pointed out.

The research, reported by Louis P. Tosti and Edwin E. Davenport, is part of a concerted Government effort to solve the basic problems enabling design of planes that will take off and land at sharp angles, eliminating the need for long runways.

Science News Letter, June 25, 1955

### ORNITHOLOGY

## Swifts Move Wings In Unison, Films Show

► TO OUR naked eyes, most birds move their wings in unison, but the swift, a champion speedster, seems to beat his wings alternately. This apparent difference caused disagreement in the bird-watching world, until a high-speed movie camera settled the argument once for all. Slow-motion shots of swifts in flight revealed that swifts also move their wings in unison but they keep tilting their bodies from side to side as they fly. A. C. Bent reported in the National Museum Bulletin 176.

Science News Letter, June 25, 1955

### MEDICINE

## Test Shows Who Should Use Brains, Not Back

► TESTS TO show which persons should use their brains and not their backs in making a living are advised by Drs. Rex L. Diveley and Rial R. Oglevie of Kansas City, Mo.

The tests consist of careful examination of the back, including X-ray pictures. The Kansas City doctors advise them even for teen-agers, so that youngsters can be advised early to go into suitable occupations where they will not be putting too much strain on backs that cannot take it.

Of more than 6,000 persons given pre-employment examinations, only 39.9% had what could be called normal backs, the doctors reported at the meeting of the American Medical Association in Atlantic City, N. J. The rest had congenital abnormalities, spinal arthritis, postural defects and other adverse spinal conditions that made them susceptible to low back injury or disability.

As a result of such examinations, the doctors said, industries can be saved compensation claims and workers can be saved time lost, not to mention the aching backs.

Science News Letter, June 25, 1955



## PUBLIC HEALTH

# Bad Eugenics Harmful

Man's present practices are called more injurious to the human race than irradiation. Doubling of mutation rate from radiation would not have effect for several generations.

► SOME OF man's poor eugenic practices threaten more danger to the survival of the human race than would come from a permanent doubling of the mutation rate through accidental poisoning of the air by irradiation, Dr. Herman M. Slatis of McGill University, Montreal, Can., wrote in *Science* (June 10).

No justification for rashness with A-bombs, H-bombs or other sources of radiation is to be taken from his report, Dr. Slatis warned.

"The basic fact to remember at all times is that any irradiation is bad, and therefore irradiation should be used only if it can be assumed that the good will outweigh the bad," Dr. Slatis said.

Society as a whole should be protected against a general increase in background irradiation, Dr. Slatis pointed out.

At the present time man is probably carrying a few harmful mutant genes. From studies of first-cousin marriages, Dr. Slatis estimated that the average person is carrying only eight abnormal recessive genes. These may include some that are not lethal to the offspring.

Mutation is probably transforming some more normal genes to abnormal ones at about the same rate that abnormal ones are being lost through selection, that is through failure of those carrying the abnormal ones to marry and pass them on to descendants.

Many mutations are lethal. If man-made irradiation increases the mutation rate, the

result is sure to be harmful. However, Dr. Slatis reported, the radiation-induced mutation rate per roentgen of radiation seems to be bounded between a third and a one-hundredth of the spontaneous rate. The spontaneous rate, his studies showed, is not as high as some authorities have recently suggested.

If accidental poisoning of the air by radiation permanently doubled the mutation rate, it would be several generations before the accumulations of new mutations amounted to very much, Dr. Slatis said.

The average number of harmful mutations would increase and so would the frequency with which persons bearing the same mutants would marry and have defective offspring.

The effect, however, would be very small. A gene that had had a frequency of 0.00010 would eventually build up to a frequency of 0.00014.

"With such small changes," Dr. Slatis wrote, "it would seem unlikely that a doubling of the mutation rate could pose a serious problem to the life of the species, and it might go almost unnoticed."

"Some of our current dysgenic practices that are countenanced because of custom, inertia, humanitarian practices or foolishness are probably more serious to the species."

Dr. Slatis is now at the Argonne National Laboratory, Lemont, Ill.

Science News Letter, June 25, 1955

## NATURAL RESOURCES

# Century Supply of Oil

► ENOUGH LIQUID fuel to meet the needs of all nations for a century lies in an oil shale area of northwest Colorado somewhat smaller than Rhode Island.

How the government is seeking ways to tap this most fabulous known oil reserve was reported to the Fourth International Petroleum Congress in Rome by Boyd Guthrie, chief of the oil shale engineering branch of the U. S. Bureau of Mines.

The 1,000-square-mile area is the richest section of the Green River oil shale formation, which extends into Wyoming and Utah and ranges in thickness from 500 to 2,000 feet.

Oil shale is a rock from which oil can be separated by distillation.

Pilot plant retorts to remove the oil have been built and tested by the Bureau near Rifle, Colo., Mr. Guthrie said. The gas combustion method, using a continuous,

single-vessel, countercurrent, gravity-flow retort, proved to have many advantages over other methods.

In the system, the vapors are condensed into a fine stable mist within the retort. The products are cooled before being withdrawn from the vessel. A great advantage of the method is that cooling water, scarce in that semi-arid area, is not needed.

Many problems remain to be solved, however, and just when an oil shale industry will develop in the United States depends upon the costs of petroleum fuels, availability of foreign oil supplies, and further technological developments with oil shale technique, he said.

Today, estimated costs for shale oil are only a little higher than average costs from petroleum. Before 1960, Mr. Guthrie predicted, costs will be equal.

Science News Letter, June 25, 1955

## NATURAL RESOURCES

# Canadians Fight Fires With Water Bombs

See Front Cover

► FIREFIGHTERS IN this vast country of forest lands, with approximately 15 fires a week, have hit upon a novel and effective method to quench small blazes from the air. They drop water bombs.

The bombs, made of laminated paper bags, are dropped from a tilting ramp of rollers in salvos of up to eight from water-based De Havilland Beavers and from helicopters, one of which is shown on the cover of this week's *SCIENCE NEWS LETTER*.

Canadian bush pilots showed their sharp aim in simulated maneuvers at Downsview Airport near Toronto, Canada.

The bags splash their contents of three and one-half Imperial gallons (about four U.S. gallons) of water in an area about 50 feet in radius. In many cases, fire fighting experts said, this is enough to halt a small blaze or keep it under control until men can reach the scene. No bomb sights are used.

The Canadian Department of Lands and Forests operates 42 aircraft, 38 of which are Beavers, light single-engined planes noted for their maneuverability and short take-off and landing runs.

The huge forest areas, called "bush country," are patrolled by these planes equipped with pontoons to operate from the lakes that pepper the forest regions.

Science News Letter, June 25, 1955

# How to Crack a Secret Code

MOST PUZZLE FANS get fun out of solving secret codes and ciphers once they grasp the scientific principles involved in code-breaking. These methods (used by American cryptanalysts in World War II) are fully explained in *Laurenz, P. D. Smith's "CRYPTOGRAPHY: THE SCIENCE OF SECRET WRITING"*. Also included is a history of ciphers from Biblical times down through Caesar, Charlemagne, Francis Bacon, Napoleon, and Pearl Harbor. 151 problems of transposition and substitution ciphers for you to try your hand at. Answers, Illustrations. Letter- and word-frequency tables for English and four other languages. 160 pages. Paperbound, \$1.00.

## Other \$1.00 Book Bargains

2. **MATHEMATICAL PUZZLES FOR BEGINNERS AND ENTHUSIASTS** by Mott-Smith. 186 mathematical puzzles based on logic, simple arithmetic, algebra, geometry, analysis, the properties of integers, permutation, etc. Answers. Second revised edition. 248 pages. Paperbound, \$1.00  
3. **THE BOOK OF MODERN PUZZLES** by Gerald L. Kaufman. More than 150 word puzzles and puzzles involving logic. If you like crosswords or Double Crosses, you'll enjoy these word labyrinths, design and pattern puzzles, observation puzzles, and quizzes. 192 pages. Paperbound, \$1.00

4. **MATHEMATICS** by Royal Vale Heath. One of the most famous stunt books ever published, this collection offers a wide variety of tricks, puzzles, and games. Tells how to figure interest rates quickly, guess a person's age, multiply large numbers in your head, etc. Illustrated. 128 pages. Paperbound, \$1.00

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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**THE ATOM**—Sir George Thomson—*Oxford University Press*, 4th ed., 204 p., illus., \$1.00. This small book by a Nobelist, addressed to the layman, includes discussion of those aspects of the subject related to world politics.

**BIRD NAVIGATION**—G. V. T. Matthews—*Cambridge University Press*, 141 p., illus., \$2.50. The experiments and observations described here point to the sun as the guide for bird migration.

**THE BUSINESS ENTERPRISE AS A SUBJECT FOR RESEARCH**: Prepared for the Committee on Business Enterprise Research—Howard R. Bowen—*Social Science Research Council*, Pamphlet 11, 103 p., paper, \$1.25. Proposing the business enterprise, one of the most pervasive and influential institutions of our society, as offering rich and varied opportunities for research.

**CONSERVATION FOUNDATION ANNUAL REPORT FOR THE YEAR 1954**—Fairfield Osborn, President—*Conservation Foundation*, 27 p., paper, free upon request direct to publisher, 30 East 40th St., New York 16, N. Y. Development of research studies has been a major Foundation objective. Projects are here described.

**CONSULTING SERVICES—Association of Consulting Chemists and Chemical Engineers**, 15th ed., 110 p., paper, \$1.00. A directory with names classified by field of specialty.

**CULTURAL PATTERNS AND TECHNICAL CHANGE: A Manual Prepared by the World Federation for Mental Health**—Margaret Mead, Ed.—*New American Library*, 352 p., paper, 50 cents. This work was intended to answer the question raised by thinking people as to whether, in an attempt to abolish hunger, cold and want, the tractors imported in underprivileged places might not rip through the fabric of cultural life.

**CULTURE AND MENTAL DISORDERS: A Comparative Study of the Hutterites and Other Populations**—Joseph W. Eaton with Robert J. Weil—*Free Press*, 254 p., \$4.00. This study of a closely cohesive sect indicates that mental hygiene is no job for piecemeal social action. The home, the school, the place of work and other social institutions must work together to achieve any substantial results.

**DEVELOPMENTS IN THE SAMPLING OF AIR-BORNE DUST**—Theodore Hatch—*Mellon Institute*, 6 p., paper, free upon request direct to publisher, 4400 Fifth Ave., Pittsburgh 13, Pa.

**DIGGING UP THE PAST**—Sir Leonard Woolley—*Crowell*, 2d ed., 125 p., illus., \$3.50. This new edition of a well-known book published 25 years ago required surprisingly little re-writing to bring it up to date. Location of sites by air photography and the dating of finds by the radiocarbon method are new techniques, but outside the scope of this book devoted to scientific digging.

**ELECTRICAL MONEY SAVING**—James A. McRoberts—*McRoberts*, 33 p., illus., paper, \$1.00. Useful hints on how you can save pennies on your electric light bills and at the same time have more efficient use of your lights and appliances.

**FIELD BOOK OF AMERICAN WILD FLOWERS**—F. Schuyler Mathews, completely revised and enlarged by Norman Taylor—*Putnam's*, 601 p., illus., \$5.00. A new and revised edition of a book originally published in 1902.

**FLOORING MATERIALS**—Ben John Small—*Small Homes Council, University of Illinois*, 8

p., illus., paper, 10 cents. Practical advice on the selection and care of home floors.

**GRASSLAND FARMING**—George H. Serviss and Gilbert H. Ahlgren—*Wiley*, 146 p., illus., \$2.96. How to provide most effectively the raw materials for meat and dairy products.

**HANDBOOK ON PESTS AND DISEASES**—Cynthia Westcott, Ed.—*Brooklyn Botanic Garden, Plants and Gardens*, Vol. 11, No. 1, 96 p., illus., paper, \$1.00. Giving the symptoms and control measures for 180 of the most common plant enemies.

**THE HUNTING WASP**—John Crompton—*Houghton Mifflin*, 240 p., \$3.00. A readable book about the ways of the huntress who paralyzes her prey so as to provide her young with live fresh meat.

**KEYSTONES OF GOOD INTERNAL ADMINISTRATION**—Ellsworth Tompkins and Galen Jones—*Govt. Printing Office, Office of Education Misc.* No. 20, 24 p., illus., paper, 15 cents. To help the administrator get things done effectively.

**LABORATORY EXPERIMENTS IN GENERAL CHEMISTRY**—J. A. Campbell and L. E. Steiner—*Macmillan*, 216 p., illus., paper, \$3.40. Describing experiments that will enable the student to discover new facts for himself rather than merely confirming what he already knows.

**THE NATURE OF LIVING THINGS**—C. Brooke Worth and Robert K. Enders—*New American Library*, 198 p., illus., paper, 35 cents. Presenting for laymen the pleasurable aspects of plants and animals as they exist in nature in fields and woods.

**ORIGINS OF RESISTANCE TO TOXIC AGENTS: Proceedings of the Symposium Held in Washington, D. C., March 25-27, 1954**—M. G. Sevag, Roger D. Reid, and Orr E. Reynolds, Eds.—*Academic*, 471 p., illus., \$12.00. An attempt to develop an explanation of why the new drugs and insecticides sometimes lose their effectiveness.

**THE PITILESS JUNGLE**—John L. Brom, Translated by Oliver Coburn—*David McKay*, 309 p., illus., \$4.50. An attempt, the author says, to "recapture the strife and mystery, anguish and danger and beauty" of Africa in this true story of 8 people who traveled over 3,000 miles in shooting a film.

**A REVISION OF THE PSYCHODIDAE (DIPTERA) IN AMERICA NORTH OF MEXICO**—Laird W. Quate—*University of California Press*, 171 p., illus., paper, \$2.50. These fuzzy little gnats have attracted little attention from entomologists because of their small size and reclusive habits.

**SEASHORES: A Guide to Animals and Plants Along the Beaches**—Herbert S. Zim and Lester Ingle—*Simon and Schuster*, 160 p., illus., paper \$1.00, cloth \$1.95. To help you identify the treasures you find on the seaside vacation.

**THE STORY OF MOSSES, FERNS AND MUSHROOMS**—Dorothy Sterling, illus. by photographs by Myron Ehrenberg—*Doubleday*, 159 p., \$2.75. A book for children of all ages about those strange plants that have neither seeds nor flowers.

**A SYSTEMATIC STUDY OF THE GENUS APHYTIS HOWARD (HYMENOPTERA, APHELINIDAE) WITH DESCRIPTIONS OF NEW SPECIES**—Harold Compere—*University of California Press*, 49 p., illus., paper, 75 cents. These little creatures are important economically because they live as parasites on some of the most injurious pests.

**TEXTILES**—Norma Hollen and Jane Saddler—*Macmillan*, 197 p., illus., \$5.00. Text for a college course on textiles with emphasis on the properties that affect the care and use of the materials.

**TRAINING HIGHWAY DEPARTMENT PERSONNEL**—Howard E. Gerlaugh and Robley Winfrey—*Highway Research Board*, 16 p., paper, 45 cents. *Science News Letter*, June 25, 1955

## ENGINEERING

### Jet Fuel Developed Under German Process

► **DEVELOPMENT OF** a new jet fuel that does not break down into engine-clogging gums and sediments as readily as older fuels was announced at the Society of Automotive Engineers' meeting in Atlantic City, N. J.

For supersonic aircraft, the fuel's stability at high temperatures permit its use as an efficient cooling agent, carrying off the tremendous heat of jet engines. The fuel will resist "breaking down" at temperatures up to 500 degrees Fahrenheit.

Samples of the fuel are now being prepared for testing by the U.S. Air Force. Socony Mobil Oil Company, Inc., is the developer of the fuel.

A new process called "hydrocracking" makes possible the manufacture of the fuel. Raw petroleum is broken down at high pressures and temperatures in the presence of hydrogen.

The process was used by the Germans during World War II when supplies of conventionally made fuel became low. But the expense of the process until recently prevented its use in the U. S.

Two factors have lowered its cost. They are the development of new chemical agents that act on the raw petroleum at lower pressures and temperatures, and new methods of making hydrogen cheaply.

*Science News Letter*, June 25, 1955

## Questions

**ASTRONOMY**—Which star has a greenish hue? p. 407.

□ □ □

**BIOCHEMISTRY**—What part of the photosynthesis reaction is still not understood? p. 402.

□ □ □

**ENGINEERING**—Which tire slips first when a car skids off the road at a turn? p. 405.

□ □ □

**ENTOMOLOGY**—How are scientists testing how a bee tells time? p. 405.

□ □ □

**NEUROLOGY**—How do deep brain waves differ from surface waves? p. 402.

□ □ □

Photographs: Cover, Ontario Department of Lands and Forests; p. 403, General Electric Company; p. 405, B. F. Goodrich Company; p. 406, Hamilton Wright; p. 412, Bakelite Company.

## METEOROLOGY

## New Wind Chart Aids Jet Weather Forecasts

► **SPEEDING JET** planes to their destinations will be aided by a new kind of wind chart described at the American Meteorological Society meeting in Kansas City, Mo., by Dr. Karl R. Johannessen of the Air Force's Air Weather Service, Washington.

Known as a "shear" chart, it is a graphic aid to forecasting more accurately the wind distribution between 25,000 and 45,000 feet. Present upper air charts, Dr. Johannessen said, do not give the forecaster information needed for swift air navigation by jet planes, which climb gradually during flight from about 30,000 feet to 40,000 feet or higher.

The forecaster now solves the problem of wind forecasts for jets by consulting wind readings at various points along the route, then doing mental tricks to get a wind prediction.

Use of the new graphic aid is justified, Dr. Johannessen said, because present wind reports are inaccurate and because meteorologists do not yet know how to predict small-scale variations in wind patterns at such high levels.

Science News Letter, June 25, 1955



Mockingbird

► **THE SOUTH** is favored in many ways. There are magnolias in the spring, for example, and heavy-scented jasmine flowers. In summer the indolent Spanish moss moves languidly on its live-oak branches, encouraging one in the praiseworthy art of waiting

until tomorrow. It is better today to listen to the mockingbird.

The mockingbird is most especially something to be thankful for. Many other birds, most of them in fact, sing industriously during the mating and nesting seasons, and then shut off the supply. They give us plenty of a good thing—sometimes rather too much—during a utilitarian period, and then stop, almost abruptly.

Not so the mockingbird. He is an artist, and his song is not merely a means to a living but an end in itself. He will tinkle and coruscate and whistle his own scintillating music, and for variety ring in bits from the repertoires of other birds, with catcalls and rusty-hinge squeaks by way of scherzo interludes. And he is apt to give us a recital at most any time and for any reason or no reason at all.

Although the North is not blessed with the mockingbird, it has an almost equally talented cousin of his in the catbird. The mockingbird and the catbird look a good deal alike, being slim, long-tailed birds of a general gray color scheme, and they have the same habit of ducking in and out among the branches when you try to get a good look at them; not flying away, but keeping inconvenient bunches of leaves between themselves and the would-be observer.

The cousinship is most clearly traced through the catbird's song. This mockingbird of the North has an assortment of notes of his own, and of imitations of other sounds, that fairly rivals the stock of his more widely reputed cousin in Dixie. There are even some loyal Yankees who prefer the catbird. And, indeed, if it were not for the mewing call he sounds when excited or alarmed, the catbird might well have been formally named the Northern Mocker.

That catcall is the most realistic imitation in nature, though it is not a deliberate imitation. Catbirds were using it long before white men came to America and brought their pets with them. But it is so much like the voice of a somewhat distressed kitten that it will fool even a cat.

Science News Letter, June 25, 1955

## ENTOMOLOGY

## Repel Insect Pests

► **THREE HIGHLY** destructive insect pests have been turned back as they attempted to invade United States orchards and gardens, the U. S. Department of Agriculture has revealed.

The Mexican fruit fly and the citrus blackfly, both injurious to citrus fruits, were detected near the Mexican border. Living adults of the Chinese rose beetle were intercepted as stowaways on airplanes flying from Hawaii to the United States.

The Mexican fruit fly was discovered infesting orchards near Tijuana, Baja California, Mexico. To halt the pest's entry across the border, all host trees in a belt five miles wide in the area on the United States side of the border are being sprayed with insecticide.

Over 282,000 trees have already been sprayed, using 61,825 gallons of bait material. Protective measures will be continued through the summer of 1956.

The citrus blackfly had already crossed the border when it was detected. The infestation was found on a single lime tree in a tourist court near Brownsville, Texas. Egg spirals and unemerged pupae were found on leaves of the tree. A thorough survey failed to uncover more infested trees in the area.

The Chinese rose beetle, which attacks a wide variety of plants, was discovered in airplane baggage and aboard airplanes heading for the mainland at Hickam Field and Honolulu airport during preflight inspection.

This beetle occurs throughout southern

Asia. It was introduced into Hawaii sometime before 1896, probably with soil around the roots of imported plants. It is not known to occur in the continental United States.

While still a long way from this country, the Mediterranean fruit fly has established itself in the highlands of Costa Rica, the report said, and the USDA is keeping track of it. The situation there is expected to become serious as the rainy season approaches and coffee berries develop over 80,000 acres.

The Mediterranean fruit fly got into Florida in 1929, but was successfully eradicated. It is not known to be present now in the United States.

Science News Letter, June 25, 1955

## ENGINEERING

## New Knowledge to Fight Losses From Corrosion

► **TO REDUCE** the \$5,000,000,000 toll taken annually by corrosion of metals, a corrosion research council is being organized by the Engineering Foundation, New York.

A \$200,000 fund is being raised by a group headed by H. H. Uhlig, chief of the Massachusetts Institute of Technology's corrosion laboratory, to investigate basic problems in metallic corrosion.

Science News Letter, June 25, 1955

Human cancer has been transplanted into the cheek pouch of hamsters.

## MATH IS FUN

By Joseph Degrazia, Ph.D.

Here is a treasury of brain-teasers. You need not be a mathematical genius to solve these problems and puzzles. What you need is to know how to **THINK LOGICALLY**—how to **REASON**. This is practically a "course" in applied logic and reasoning—besides being an immense amount of fun that will keep you absorbed for many hours. You will find not only that **MATH IS FUN**, but also that learning math can be fun!

**CONTENTS:** Trifles—On the Borderline of Mathematics—Faded Documents—Cryptograms—How Old Are Mary and Ann?—Wolf, Goat and Cabbage—and Other Odd Coincidences—Clock Puzzles—Trouble Resulting from the Last Will and Testament—Speed Puzzles—Railroad Shunting Problems—Agricultural Problems—Shopping Puzzles—Whimsical Numbers—Playing with Squares—Miscellaneous Problems—Problems of Arrangement—Problems and Games—Solutions.

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# • New Machines and Gadgets •

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✿ **WALL COVERING** made of plastic duplicates the form, color and texture of brick or stone. Made of lightweight, fire-resistant rigid vinyl, the covering is molded in two-by-four-foot sheets that can be applied to a wall with an adhesive. The easy-to-clean plastic is available in patterns of brick, cut stone or ledge rock.

Science News Letter, June 25, 1955

✿ **GRILLED FRYING** pan has many protuberances pointing upward on its frying surface. Eleven inches in diameter, the aluminum grill-pan prevents excess fat from soaking into the food resting on the bumps. The bumps also minimize sticking and allow faster heating.

Science News Letter, June 25, 1955

✿ **SOFTER BRUSHES** are made possible by a new type of monofilament that splits into dozens of tinier branches. Suitable for brushes for furniture, vacuum cleaning attachments, window washing, etc., the flagged brush fiber is made from a styrene material. The burst-tip fibers prevent visible scratching of polished surfaces.

Science News Letter, June 25, 1955

✿ **MOLDED GRIP** for a golf club handle, shown in the photograph, is designed to save time and effort in acquiring the right grip for good golfing. Molded in the shape of the hands properly placed for the best



swing, the handles of vinyl resin come in all sizes and can be attached to any club.

Science News Letter, June 25, 1955

✿ **TELESCOPIC EYEPIECE** converts standard 50 mm and accessory 90 mm screw-mounting camera lenses into telescopes. Measuring one and three-quarter inches in diameter and three-quarters of an inch deep, the eyepiece creates a 3.5-power telescope

with a 50 mm lens and a 6-power magnification with a 90 mm lens.

Science News Letter, June 25, 1955

✿ **NYLON BABY** bottles are practically indestructible. Made in Britain, the nylon bottles, unlike other plastic articles, can be sterilized repeatedly in boiling water. In addition to being clear, they are described as being only one-tenth the weight of their glass counterparts.

Science News Letter, June 25, 1955

✿ **TINY PADLOCK** is designed for busy mothers who want to lock out their children from playing with electrical equipment. The lock handle is small enough to slip through the hole in an electric plug prong, preventing junior from plugging a wire into an outlet.

Science News Letter, June 25, 1955

✿ **MAILBOX SIGNAL** answers the question, any mail today? Made of stainless steel, the rustproof device is slipped on to the mailbox and a tab locked. No tools are needed. When the mailman opens the box's door, the signal is released automatically.

Science News Letter, June 25, 1955

## Do You Know?

Until they become accustomed to heat, persons doing hard work in hot places may vaporize 10½ to 12½ quarts of sweat a day.

Important amounts of uranium are found in lignite beds in the buttes north of the Black Hills in the United States, a low grade source considered a strategic reserve.

One out of every five cars in use today has been driven more than 80,000 miles.

Early axle grease was made by natives of New Mexico by mixing tallow with tar obtained from the roasting of green pine branches.

Tiny magnets have been produced that can lift 200 times their own weight.

The automobile that costs \$3,000 today would cost approximately \$100,000 if it were manufactured by job shop methods at present labor rates.

A British "gold gun," shaped like a heavy automatic, fires radioactive gold isotopes into affected areas of the body after being set to eject the bullets to the depth of the tumor.



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